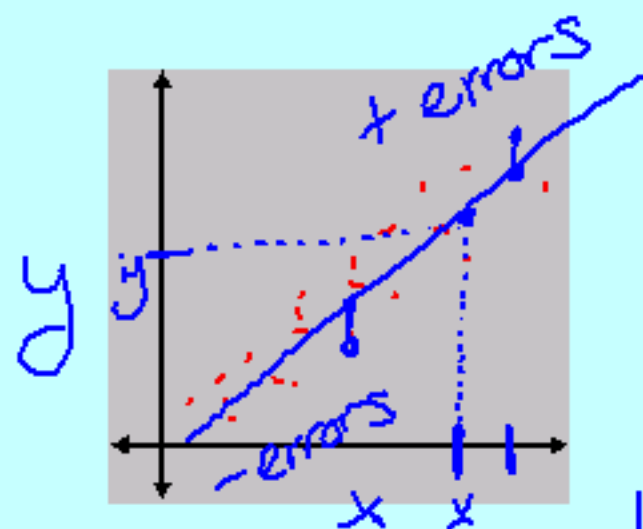


Chapter 2

Line of Best Fit



$$\text{Errors} = \text{actual pt.} - \text{predicted value}$$

* vertical (y) distances

line of best fit: $\sum + \text{errors} = \sum - \text{errors}$

Linear Regression Line:

- Straight line
- Describes how... the response variable (y) changes as explanatory var (x) changes
- Used to ... predict values of y from given value of x
- Requires that... have expl. & resp. variable

avg. for
scatterplot

$$y = mx + b$$

average/
mean

Most accurate Regression line:

- Called: **Least Squares Regression line (LSR line)**

- Definition: minimizes ^{squares of} the errors in the y-direction

- Form: $\hat{y} = a + bx + cx^2 + dx^3 + \dots$

- Pieces: \hat{y} (sample), a (int.), b (slope)

- $b = \text{slope} = r \left(\frac{S_y}{S_x} \right)$ $b_1 = r \left(\frac{S_y}{S_x} \right)$

- $a = \text{intercept} = \bar{y} - b\bar{x}$ $b_0 = \bar{y} - b_1\bar{x}$

- always ... passes (\bar{x}, \bar{y})

- not - resistant

- on calculator: LSR line:

STAT \rightarrow CALC \rightarrow #8: LinReg(a+bx) Xlist, Ylist, Y1

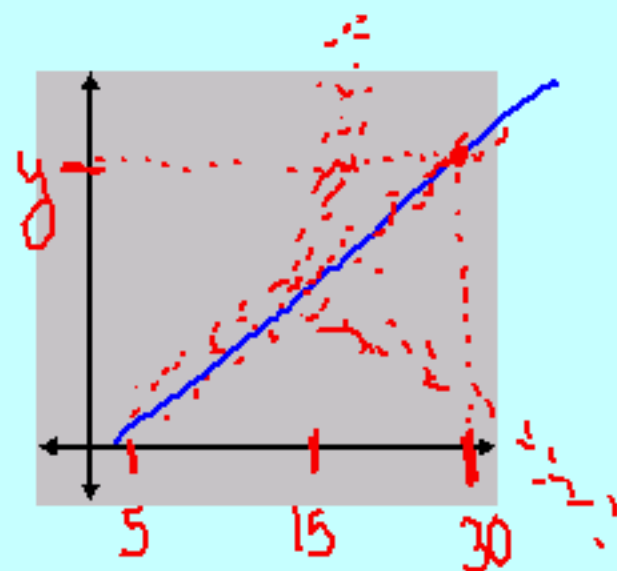
$r =$
 $S_y =$
 $S_x =$
 $\bar{x} =$
 $\bar{y} =$

* round to
3-4 dec. places

Vocab:

Extrapolation-

using a value of x
that is far outside
of range that was
used to create LSR line
for predicting a value of y .
* not good - uncertain



#8

Dist	900	901	902	903
Pred				

$y_1(900)$
 $y_1(901)$

Dist - X
Airf - y

$$y = a + bx$$